DESCRIPTION OF A NEW SPECIES OF *APISTOGRAMMA* REGAN, FROM THE OYAPOCK AND APPROUAGUE RIVER SYSTEMS (TELEOSTEI : CICHLIDAE)

by

Sven O. KULLANDER (1)

RÉSUMÉ. – Dans les bassins des fleuves Oyapock et Approuague en Guyane française et au Brésil, la nouvelle espèce *Apistogramma gossei* paraît isolée géographiquement des autres espèces d'*Apistogramma*. Les affinités précises sont incertaines, mais elle appartient au groupe *regani* et par son aspect général se rapproche beaucoup d'*A. ortmanni* (Eigenmann).

ABSTRACT. – *Apistogramma gossei* n.sp., from the Oyapock and Approuague river systems in French Guiana and Brazil, appears to be geographically isolated from the other species of the genus. Its relationships are uncertain, but it belongs to the *regani* species group and is most similar to *A. ortmanni* (Eigenmann).

Apistogramma gossei n.sp. (Fig. 1)

Biotodoma taeniatum; (*nec Mesops taeniatus* Günther ; *pt*) Pellegrin 1904, p. 187 (Guyane française, MNHN 03-39). - (Kullander 1980, p. 15 (reference to Pellegrin 1904).

Apistogramma ortmanni ; (*nec Heterogramma ortmanni* Eigenmann) Vandewalle 1973, p. 280 (caudal skeleton; IRSNB 15796, now IRSNB 590, 591).

Apistogramma sp.nov. (Oyapock) Kullander 1980, pp. 14, 19 (reference to Vandewalle 1973), p. 26 (listed; IRSNB material), p. 33 (teeth), p. 50 (relationships).

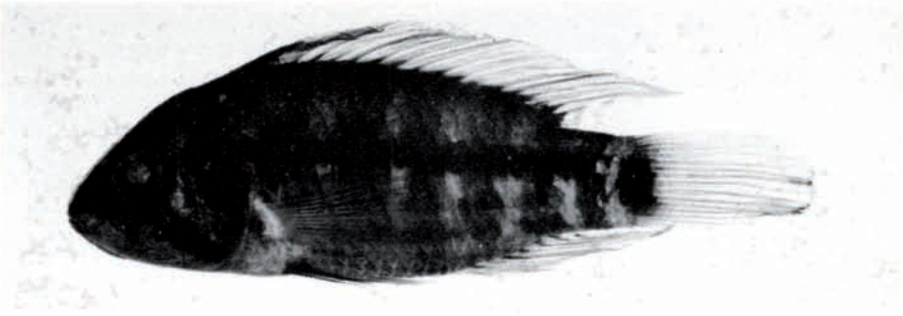

Fig. 1. – Holotype of *Apistogramma gossei*, a male, 47.1 mm SL, from Martinique, Amapá territory, Brazil.

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(1) Section for Vertebrate Zoology, Swedish Museum of Natural History, S-104 05 Stockholm, Sweden.

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Diagnosis

A species of the *Apistogramma regani* group, similar to *A. ortmanni*, but with only faint abdominal stripes, and the caudal fin immaculate or with a few scattered light spots close to the caudal base spot.

Material (1)

Holotype : MNHN 1981-231. ♂, 41.1 mm SL, Brasil, terr. Amapá, R. Oyapock system, Martinique. 9 November 1976. Leg. F. d'Aubenton.

Paratypes : BMNH 1926.3.2.:962-969 (pt.). One ♂, 43.7 mm, two ♀♀, 23.9, 29.4 mm, one uncertain ♀, 43.5 mm SL. Guyane française, R. Approuague system, Crique Marie and Crique Boby, No date. Leg. K. Ternetz. – IRSNB 590. One ♂ ?, 37.9 mm SL. Guyane française, R. Oyapock system, Igarapé Cumuri on the left bank of the R. Oyapock, above the first falls of the Grande Roche. 5 December 1962. Leg. J.P. Gosse (Sta. 28). – IRSNB 591. One ♂ ?, 40.2 mm, one sex indet., 24.0 mm SL. Same data as preceding. – IRSNB 592. One ♀, 27.2 mm SL. Brasil, terr. Amapá. R. Oyapock system, road Clevelândia - airfield, pool near R. Pontanari. 6 December 1962. Leg. J.-P. Gosse (Sta. 29). – IRSNB 593. One ♂, 30.5 mm, one ♀, 25.4 mm SL. Guyane française, R. Oyapock system, right bank of the R. Oyapock, between Sikini and Camopi, Crique Adjoumba. 6 December 1962. Leg. J.-P. Gosse (Sta. 16). – MNHN 03-39. One ♀, 24.7 mm SL. Guyane française. No date. Leg. F. Geay. – MNHN 1981-357. One ♂, c. 36.2 mm SL. Guyane française, R. Oyapock system, Trois Sauts, Crique Mayule. 29 September 1976. Leg. F. d'Aubenton (AFV 058). – MNHN 1981-359. One ♀, 25.1 mm SL. Guyane française, R. Oyapock system, Mare Ipa, near Trois Sauts. 8 October 1976. Leg. F. d'Aubenton. – MNHN 1981-558. Two ♀♀, 17.1, 18.7 mm, one sex indet., 12.6 mm SL. Guyane française, R. Oyapock system, Trois Sauts, Crique Utuai. 30 September 1976. Leg. F. d'Aubenton (AFV 090). – MNHN 1931-562. One ♀, 20.2 mm, two sex indet., 13.4, 17.1 mm SL. Guyane française, R. Oyapock system, Crique Nouciri. 22 October 1976. Leg. F. d'Aubenton.

Only the holotype is in acceptable condition ; the paratypes are mostly faded, old, or with various injuries.

Description

Holotype

Elongation and lateral compression are moderate. The deepest point is in the region of the vent, but it appears that the ventral fin bases are slightly (post mortem) displaced ; the paratypes are deepest at about the ventral fin insertion. The dorsal base contour rises slowly to about the seventh dorsal spine, sloping posteriorly straight to the discontinuous upper caudal peduncle edge, which is straight, only slightly sloping. The chest contour is straight, nearly horizontal. The head is moderately elongate, apically rounded ; the predorsal contour rises vertically to above the posterior part of the orbit, continuing in a straight line, less steeply after a minor bend, and continuous with the predorsal contour ; the preventral head contour is rounded, but the lower jaw angle is marked. The snout is roundish in profile, with slightly convex, about equal contours. The orbit is entirely in the upper, chiefly in the anterior, head halves and just subtangential. The maxilla reaches backwards to below the anterior third of the orbital diameter ; the tip is exposed, the angle 53°. The ascending processes of the premaxilla, at 54°, reach to above the anterior third of the orbit. The preoperculum is entire.

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(1) BMNH = British Museum (Natural History), London ; IRSNB = Institut royal des Sciences naturelles de Belgique, Brussels ; MNHN = Muséum national d'Histoire naturelle, Paris.

The predorsal scales are cycloid anteriorly and dorsally to a forward-curved line between the origin of the dorsal fin and the superior tip of the preoperculum. The preventral scales are cycloid, and in three longitudinal series; no naked exposed thoracic parts. The cheek scales lie in three series, covering all except the anteroventral corner and a narrow adpreopercular margin ; they are mostly cycloid, only the posteriormost scale in the upper two series ctenoid: the arrangement on the left side is irregular, probably due to regeneration. The gill cover scales are cycloid, except the upper opercular scales; the preopercular scales are in a single series: the upper lateral line (13 tubed + 1 pored scale) originates in this series, above the operculum, rising three scales before entering and remaining in the third horizontal series above that containing the lower lateral line, extending to below the end of the spinous dorsal fin, at three (initially) to one (medially) to a half (terminally) scale distance from the dorsal fin: three scales overlap with the lower lateral line (4 tubed + 4 pored scales), which is not continued on the caudal fin. The proximal one-third of the caudal fin is covered by a sheath of ctenoid, some cycloid outwardly, scales.

The dorsal fin spines are subequal in length from about the fourth: the lappets are truncated with a posterior point, all free, reaching hardly beyond the spine tips; the soft fin is pointed, the second ray forming a tip reaching to almost the middle of the caudal fin. The soft anal fin is pointed, the second and third ray forming a tip extending to about one-third of the caudal fin length. The pectoral fin is asymetric, rounded, the fourth and fifth rays longest, reaching to above the anal fin origin. The ventral fin is pointed, with a very short elongation of the first ray, reaching to the base of the first anal ray. The caudal fin has an uneven hind edge with the lobes broadly rounded, the middle concave but with the rays ending slightly beyond the membrane.

The jaw teeth are subconic, not or slightly recurved, the size differentiation slight; 27/31 in the upper/lower jaw outer hemiseries. There are numerous teeth behind the outer series, about four (or five) series in the lower jaw, about three series in the upper jaw, one nearly as long as the outer series. The gill rakers are short. A piece of skin connecting the operculum and the gill arch angle is apparently atypical.

Comparison with other specimens

The counts are from the holotype (indicated by an asterisk), and the paratypes (D, A, squ. long., and cheek counts from all; other counts only from the BMNH and IRSNB material and the holotype, unless otherwise stated). D. XV.6 (3), XV.7* (17), XVI.6 (2). A. III.5 (1), III.6*(13), III.6 (5), III.7 (3). P. 11 (6), 12* (5). 16* (11). Smaller specimens have shorter soft dorsal and anal, and ventral fins. The caudal fin is roundish or roundish- subtruncate. Squ. long. 22* (15), 23 (2), - (5). The upper lateral line has 10-15 canals, 14-16 scales total count; the lower 3-8 canals, 6-8 scales total count, commonly continued on the caudal fin by one canal. Cheek with 3* (18) or 4 (4) scale series; squ. op. 8 (4), 9* (3), - (4); squ. sop. 2 (1), 3* (7), 4 (2), - (1), in a single series; squ. iop. 2* (4), 3 (5), 4 (2).

Predorsal scales 9-11, preventral scales 10-11; squ. caud. 4-8. Usually a raker in the epi-/ceratobranchial angle; 2* (4) or 3 (7) external ceratobranchial rakers; 10 (3), 11 (1), 12 (3), 13* (3), - (1) rakers on the lower pharyngeal tooth plate. Jaw teeth (from large specimens) more numerous in the lower jaw, 23-31/24-32 in the upper/lower jaw outer hemiseries, two or three inner series in the upper, two to four inner series in the lower jaw. Vertebrae 12+12 (holotype, IRSNB, and three BMNH specimens radiographed, n = 10) ; two supraneurals (in eight radiographed specimens, occipital region too diffuse in two others).

Lower pharyngeal tooth plate (Fig. 2; from IRSNB 593, 30.5 mm SL) : the teeth are unicuspid, marginally and anteriorly subconic with rounded bases, internally with rostrocaudally elongated bases and a posterior antrorse cusp, those in the posterior series strongest, with antrorse posterior cusp.

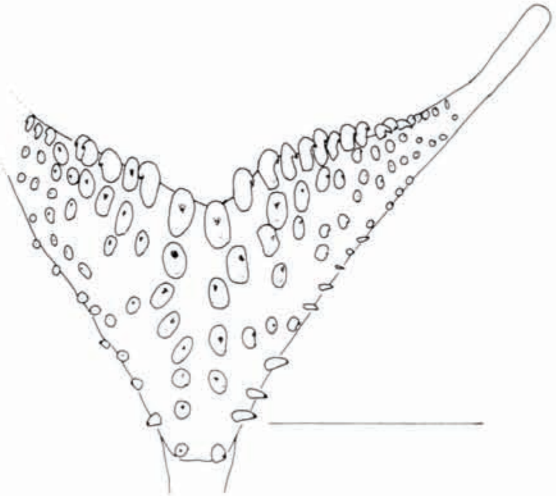

Fig. 2. – Lower pharyngeal tooth plate of *Apistogramma gossei*. Occlusal view. Scale 1 mm. From IRSNB 593, 30.5 mm SL.

Coloration

Holotype : The ground colour is yellowish white; countershaded, increasingly overlaid with dark pigment dorsally, the spaces between the bars on the sides remaining pale. The markings are blackish brown, but the vertical bars are paler brown.

The cheek, preoperculum and interoperculum are brownish grey; the lips and lower jaw greyish ; a faint dark spot behind the lower lip mesially ; operculum, suboperculum, preorbital and nape dark grey. The preorbital stripe is distinct; the superorbital stripe is also distinct, reaching nearly to the midline of the nape. The suborbital stripe is intense, as wide as the pupil, running almost straight obliquely caudad, narrowly interrupted on the preoperculum. The postorbital stripe, narrower than the pupil, connects the lateral band with the orbit.

The vertical bars are distinct, slightly wider than the interspaces; intensified on the back close to the dorsal fin and extended onto the dorsal fin base; (1) a spot close to the dorsal fin; (2) reaches ventrally to the lateral band, expressed most distinctly, like a spot, above the upper lateral line; (3) only faintly just below the lateral band; (4) reaches ventrally to near the vent; (5-6) reach to the lower edge of the side; (7) across the caudal peduncle. The lateral band is about one scale wide, slightly widening posteriorwards, uniformly pigmented, but the rather sharp edges are somewhat uneven; extending to Bar 7.

A faint dorsal pectoral spot; the pectoral axilla is brownish basally on the external surface. A narrow midventral stripe runs from the genital papilla to the ventral fin bases. A blackish dot lateral to each ventral spine. Indistinct abdominal stripes form from spots on the base of each scale : (1) from the upper edge of the pectoral axilla, vanishing above the anal fin base, (2) from the lower edge of the pectoral axilla, vanishing above the anal fin, (3) from between the pectoral and ventral fin bases to above about the middle of the anal fin.

The first two dorsal fin membranes are black; the dorsal fin otherwise greyish, with darker basal areas from flank bar continuations; three series of light spots basally across the soft portion. The anal fin is faintly smoky, the soft part membranes with a basal dark spot; about three series of light spots basally on the posterior portion. The outer edge of the ventral fin is blackish. The caudal fin is smoky, immaculate save for an accentuated rectangular base spot which is margined above and below by pale brownish.

Paratypes : Most of these are faded. There is no obvious sexual dichromatism. Bars 5-7 do not fade out below the lateral band. The midventral stripe and the black dot close to the ventral fin are absent or present without sex correlation. Faded specimens may show the lateral band rather spotty. The abdominal side markings consist either of faint abdominal stripes or of short vertical streaks (from dark scale edges/ bases), but the latter pattern appears clearly only in faded specimens. All specimens have the ventral fin edge darkened. The caudal fin may feature a few scattered light spots close to the base spot, and the anal fin edge may be darkened.

Distribution

Known only from the Oyapock and Approuague river systems (French Guiana and Brazil), as, apparently, the sole representative of the genus. The Approuague localities could not be precisely located; the other localities are plotted in Fig. 3.

Ethymology

Named for Dr Jean-Pierre Gosse, collector of part of the type material but especially in recognition of his substantial contribution to South American ichthyology in collecting and taxonomic studies.

Discussion

Material of *A. gossei* was considered in my recent revision of the genus (Kullander, 1980), but because well preserved material was not available, a formal description had to be postponed. Eventually more specimens appeared, including one well preserved (the holotype), allowing a proper description to be made, as well as identification of the broad relationships of the species.

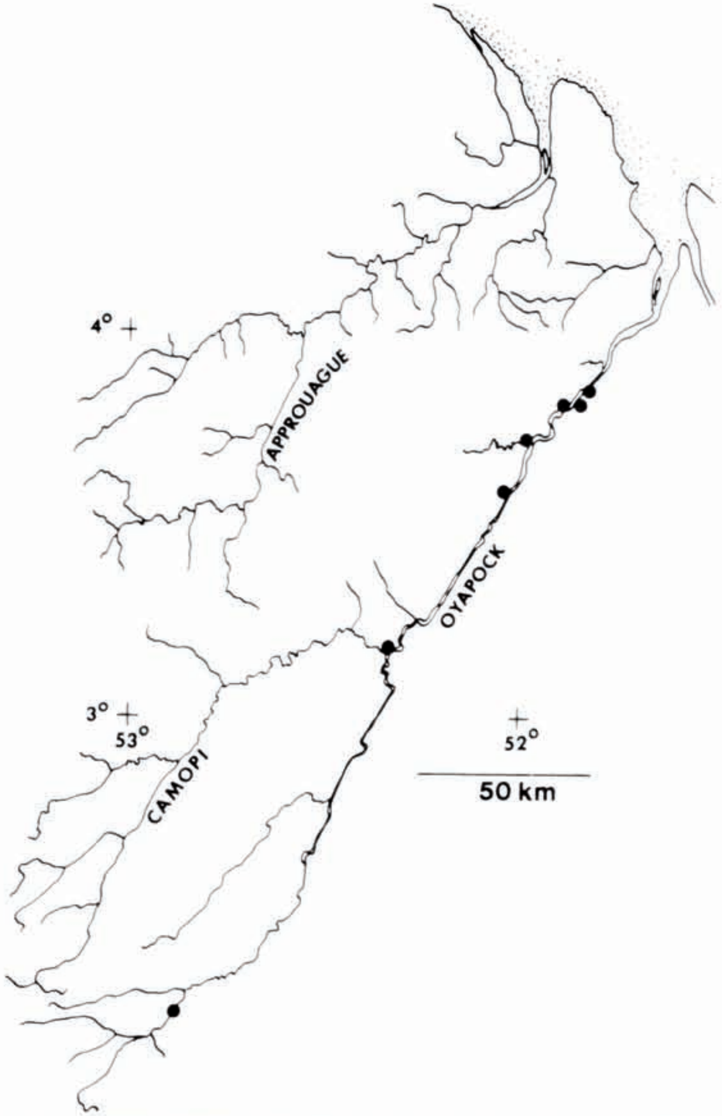

Fig. 3. – Localities of *Apistogramma gossei*. Going down the Oyapock river: Trois Sauts, Crique Adjoumba, Crique Nouciri, Crique Montabo (Armontabo), Grande Roche, Clavelândia, Martinique.

Apistogramma gossei is of interest chiefly for its geographical distribution. The cichlid fauna of French Guiana is very little known: material is available chiefly from the Oyapock and the Maroni river systems. Interestingly, the Maroni has one endemic cichlid species, *Geophagus harreri* Gosse (1976), and two, maybe three cichlid species appear to be endemic to the Oyapock system, *viz. Geophagus camopiens* Pellegrin (Gosse 1976), *Retroculus septentrionalis* Gosse (1971), and *Cre-*

nicichla ternetzi Norman (1926). The Oyapock fauna in general remains to be investigated, however, and no estimate of the degree of endemism can be given. The presence of *A. gossei* in the neighboring, little collected Approuague system, is a hint that more collecting in the interior of French Guiana may reveal a wider range for the supposed endemics.

Apistogramma gossei is well separated geographically from the other *Apistogramma* species. To the west is found *A. steindachneri* (Regan) in the Suriname R. system, westwards to the Essequibo R. system and possibly the upper R. Branco system, and *A. ortmanni* (Eigenmann), in the Corantijn and Essequibo R. systems (Kullander & Nijssen in prep.). To the east, *A. caetei* Kullander and *A. parva* Ahl, near Belém, south of the R. Amazonas, and north of the R. Amazonas *A. geisleri* Meinken at Óbidos, are closest geographically (*cf.* Kullander 1980). But the Amapá territory, the northern part of the state of Para, and the interior of French Guiana are virtually unexplored ichthyologically, so the isolation as well as the restricted distribution of *A. gossei* may be more apparent than real.

The relationships of *A. gossei* remains an open question, although it clearly belongs to the *regani* species group, with relatively short dorsal fin lappets, rounded caudal fin, rather distinct vertical bars, caudal base spot, and lacking a lateral spot (*e.g.*, Kullander 1980, 1982a). It differs from most other *regani* group species, *viz. A. taeniata* (Günther), *A. regani* Kullander, *A. caetei* Kullander, *A. geisleri* Meinken, *A. reticulosa* Kullander, *A. commbrae* (Regan), *A.pleurotaenia* (Regan), and *A. ortmanni*, in the immaculate or feebly spotted caudal fin of males. No data are available on males of *A. piauiensis* Kullander. The caudal fin of *A. moae* Kullander and *A. eunotus* Kullander, is immaculate or vaguely spotted; but both have a colour pattern otherwise quite distinct from that of *A. gossei* (*cf.* Kullander 1980, 1981). The abdominal markings vary a great deal among *Apistogramma* species; in the *regani* group, abdominal stripes show more or less distinctly,and closely related species may differ chiefly in this respect (Kullander 1982b). Otherwise, the faint, rather than accentuated abdominal stripes, the virtually immaculate, rather than spotted caudal fin of males, and the caudal spot shape would separate *A. gossei* on the one hand and *A. ortmanni* and *A. regani* on the other hand. In the latter two, the caudal spot is characteristically high, and may extend over the entire base (*cf.* figures in Kullander 1980, and Kullander & Nijssen in prep.); in *A gossei* the spot is rather squarish. It is with these species that *A. gossei* agrees best in general appearance; especially with the also rather elongate *A. ortmanni.*

Apart from the colour pattern, *A. gossei* is characterized by more gill rakers (2-3, versus 0-1), and lower pharyngeal tooth-plate rakers (10-13, versus 8-11, mode 9) than *A. ortmanni*(Corantijn material; Kullander & Nijssen in prep.).

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Table 1. – Morphometry of *Apistogramma gossei*. Range and mean (± standard error) in per cent of SL; SL and holotype measurements in mm. Data from BMNH 1926.3.2:962-969 pt., IRSBN 590-593, and MNHN 1981-231, holotype (n = 11).

Measurement	n	Range	$\bar{x} \pm S_{\bar{x}}$	Holotype
SL / mm /	11	23.9 - 47.1		47.1
Head length	11	30.6 - 34.4	32.6 ± 0.32	14.4
Head depth	11	25.4 - 29.1	27.7 ± 0.37	12.9
Body depth	11	31.7 - 38.2	35.7 ± 0.58	17.0
Predorsal length	11	34.3 - 38.7	36.1 ± 0.45	16.4
Preventral length	11	38.6 - 43.3	40.2 ± 0.47	18.2
Orbit diameter	11	11.3 - 14.2	12.8 ± 0.27	5.5
Snout length	11	4.6 - 6.9	5.9 ± 0.25	3.1
Cheek depth	11	5.8 - 8.5	7.4 ± 0.25	3.8
Head width	11	15.9 - 17.7	16.7 ± 0.18	7.6
Interorbital width	11	7.5 - 8.3	7.9 ± 0.09	3.8
Preorbital depth	11	2.5 - 3.8	3.3 ± 0.13	1.8
Upper jaw length	11	9.2 - 11.7	10.5 ± 0.27	5.5
Lower jaw length	11	13.4 - 15.3	14.5 ± 0.21	7.2
Postorbital head length	11	13.6 - 15.0	14.3 ± 0.12	6.5
Caudal peduncle depth	11	15.0 - 18.6	16.7 ± 0.36	7.9
Caudal peduncle length	11	10.8 - 14.2	12.9 ± 0.27	6.7
Dorsal fin base length	11	54.6 - 61.1	58.3 ± 0.58	28.5
Anal fin base length	11	18.4 - 21.3	19.3 ± 0.23	9.2
Pectoral fin length	9	30.5 - 33.2	32.1 ± 0.25	15.1
Ventral spine length	11	13.6 - 16.7	14.8 ± 0.26	6.9
Ventral fin length	11	26.4 - 34.3	29.7 ± 0.87	15.5
Last dorsal spine length	10	17.3 - 22.6	19.6 ± 0.56	10.0
Last anal spine length	11	15.9 - 19.9	18.4 ± 0.38	8.9